

## FRAME PATTERN DETECTION IN AN OPTICAL RECEIVER

### Abstract of the Disclosure

The invention relates to methods and apparatus that align serial data so as to provide corresponding parallel data. The methods and apparatus search for framing patterns in demultiplexed serial data and shift the demultiplexed serial data to provide aligned parallel data. Advantageously, embodiments of the invention can operate in real time in a relatively high-frequency optical network, such as SONET. One embodiment of the invention detects a frame pattern and provides a nibble shift output. The nibble shift output is applied to another circuit, such as a phase detector or a voltage controlled oscillator, to shift the demultiplexed serial data by a nibble, i.e., four bits. Shifts of smaller increments, i.e., one bit, two bits, or three bits, are applied to the demultiplexed data within a framing circuit to allow the framing circuit to fully align the parallel data.

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